INSTALLATION, OPERATION AND MAINTENANCE MANUAL



FW RANGE – Water condensing units
Cooling only
Monosplit
Single-phase

FW07Q6 – FW09Q6 – FW14Q6 – FW18Q6 – FW24Q6 – FW36Q6

Le spécialiste de la climatisation sans unité extérieure

Air Conditioning

1 INTRODUCTION

The present document constitutes the installation, operation and maintenance manual for the following water condensing units:

- FW07Q6 (model code WQF101).
- FW09Q6 (model code WQF102).
- FW14Q6 (model code WQF103).
- FW18Q6 (model code WQF104).
- FW24Q6 (model code WQF105).
- FW36Q6 (model code WQF106).

A water condensing split system consists of:

- An indoor unit (IU) which can be a wall mount unit, ceiling cassette, ducted indoor unit or floor mounted/ceiling console.
- A condensing unit (CU) connected to the water network (town water, water loop).

The fitting must be carried out by a person with appropriate skills and qualifications. This person must respect the standing rules and regulations. The builder declines any responsibility and the guarantee will no longer be applicable if the fitting instructions have not been respected. A case of any doubt or for any additional detailed information, please contact your local retailer.

2 RECEIPT AND STORAGE OF THE GOODS

Please inspect the goods on receipt before unpacking. Any choc may have caused serious damage to unit's function which will not be taken under warranty.



In case of any deterioration, detailed reservations must be made and immediately sent by registered letter to the carrier indicating the damages observed. A copy of the letter must also be sent to the builder or to the retailer.

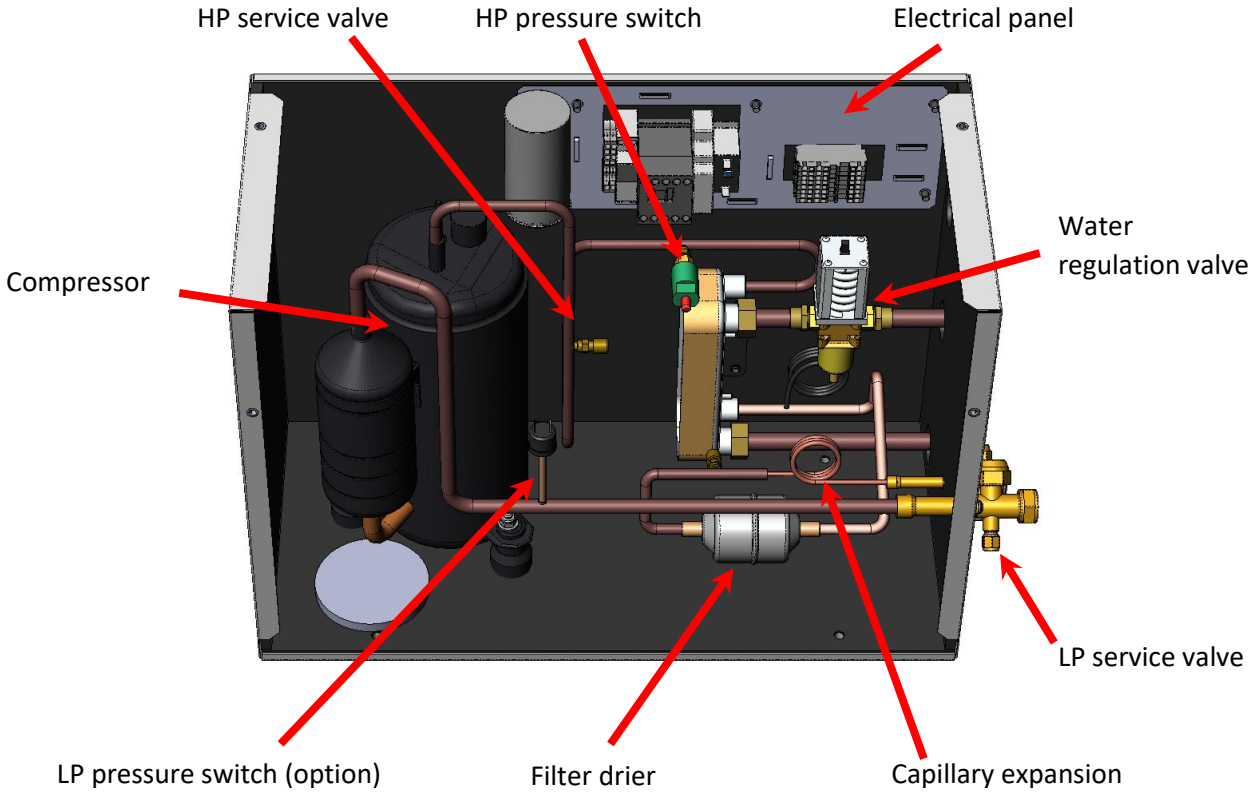
The machine must not be carried or placed upside-down. It must be stocked inside and perfectly sheltered from rain and snow, etc. Weather variations (high or low temperatures) must not damage the unit. Very high temperatures (from 60°C) may damage certain plastic parts and cause permanent damage. Moreover, certain electronical components may not function properly.

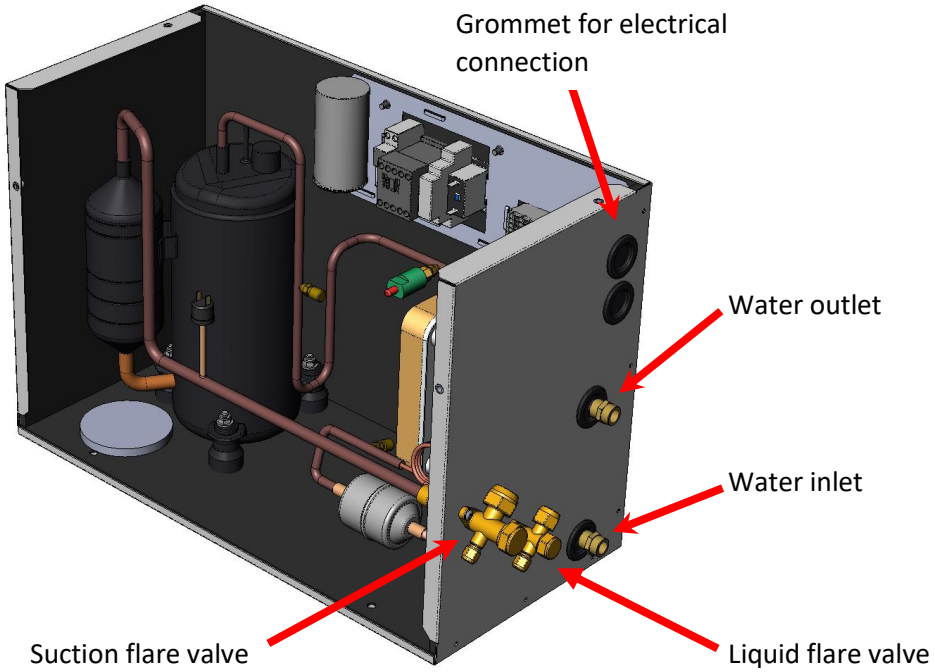
3 DESCRIPTION OF THE GOODS

Each CU is supplied with:

- A wall mount fixing rail.
- 2 water connection flexible hoses with 4 flat washers.
- An installation, operation and maintenance manual containing the **electrical drawing** and the **commissioning form**

4 DESCRIPTION OF THE UNIT



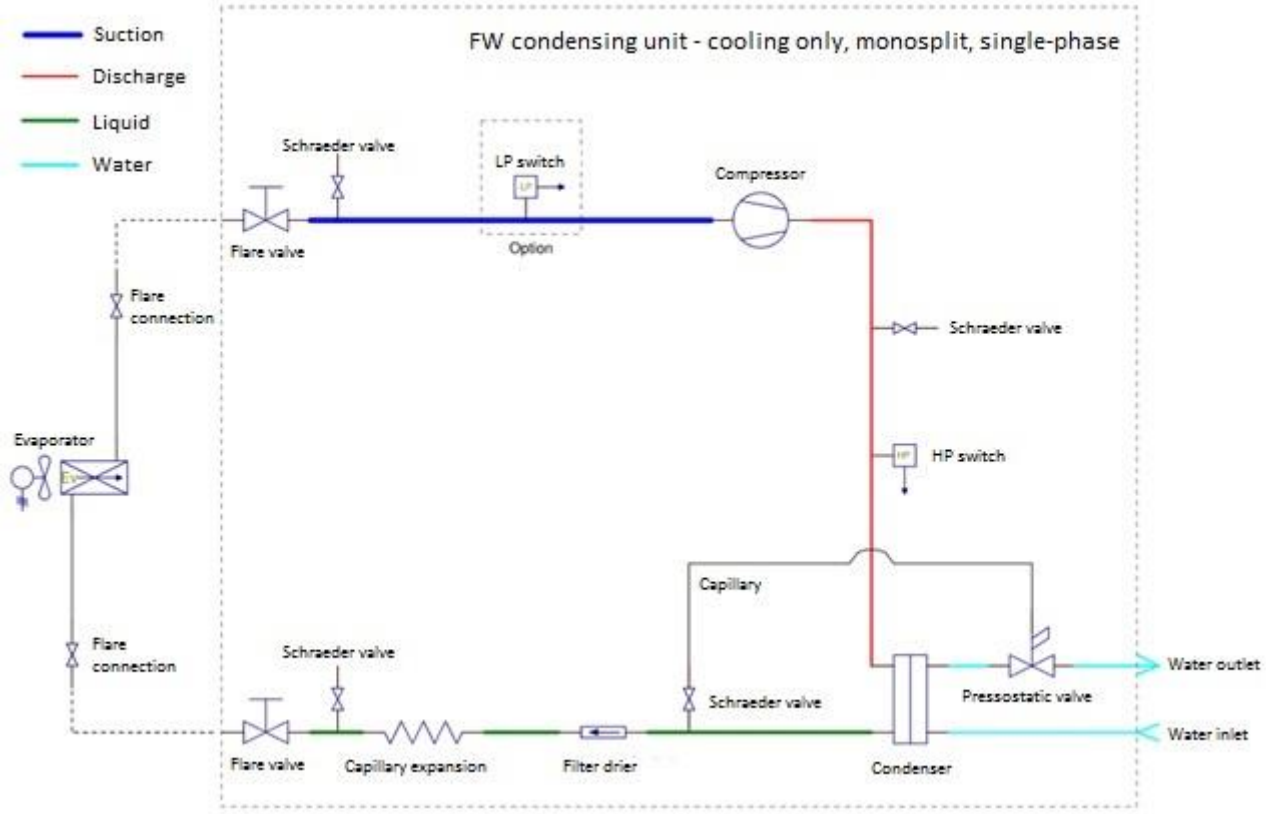


Each CU model exist in 4 versions specified by its option pack which corresponds to the last two digits of the article code (the first 6 being the model code):

		WITHOUT LP switch	WITH LP switch
Enhance noise insultation	WITHOUT	AH	BH
	WITH	CH	DH

Example: WQF104**DH** = FW 14 Q6 with the options « LP switch » and « Enhanced noise insulation ».

5 FLUIDIC DIAGRAM



6 INSTALLATION OF THE UNITS

This section explains how to choose the location to install and set up the CU.

Concerning the IU, please refer to its own documentation (supplied with the IU).

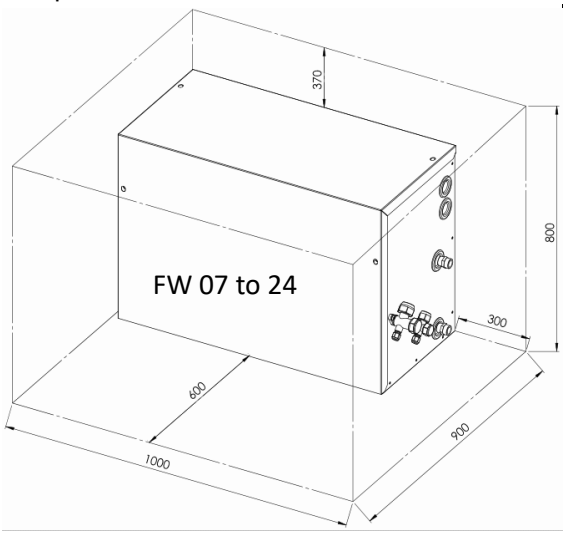
Choice of location:

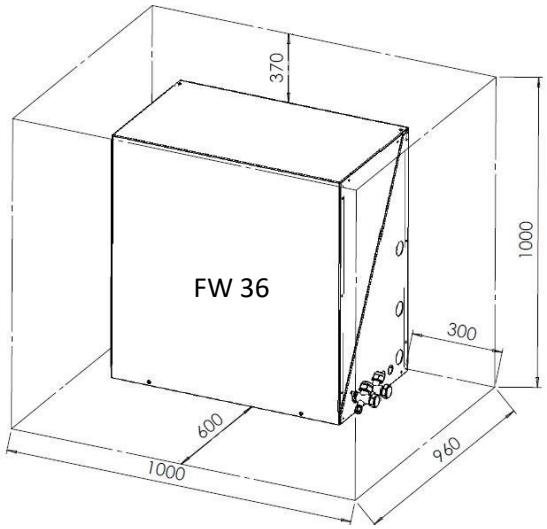
Make sure the support on which the CU is installed is solid. CUs must be installed in a non-aggressive environment. It is therefore necessary to avoid places with aggressive vapours, splashes of liquid, a high dust, a marine atmosphere.

⚠ Care must be taken to ensure that the GC remains **accessible** for maintenance and **respect the service spaces** that are defined for:

- Easy access to the CU.
- Easy access to the flared valves and water connections.
- Removing the cover.
- Reading the ID-plate.
- Fitting of accessories (water filter, water flow meter).

The service spaces are as follows:

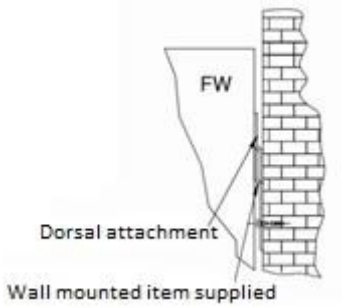




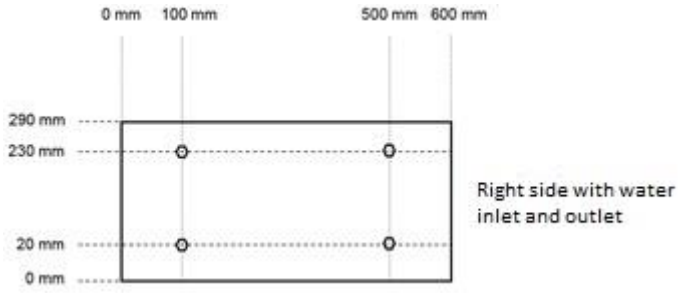
Setting up:

It is possible to install the CU in two ways:

- First possibility: hanging the CU against a wall using its back mounting rail (supplied with the CU) :



- Second possibility: installation of the CU (on feet, brackets ...) and fixing the CU on the bottom. For FW size 07 to 24, four hexagonal M8 inserts are provided for this purpose:



FW 07 to 24 top view

For size 36, the holes are not pre-drilled.

All precautions should be taken to avoid the transmission of vibrations. If the vibrations are an important part of the installation, it is necessary to favor an installation according to the second possibility.

7 INSTALLATION : FRIGORIFIC CONNECTIONS

All the usual precautions should be taken when setting up the refrigerant connections. In particular, it is necessary to limit the number of bends, to make a 2% gradient on the suction line and to make the necessary oil traps in order to have a good oil circulation. It must also be ensured that the connections are plugged in order to prevent any impurity or moisture penetration during the installation

The maximum distance between the CU and the IU is 20 linear meters and the maximum height difference is 5 m. The length of the liquid line as that of the suction line should not exceed 20 meters.

The GI36-40 / 75Pa, GI36-40 / 150Pa and CI36 indoor units do not have the same connection diameter as the FW36Q6 condensing unit for the suction line. You need to install an adaptation at the CU side**. This is delivered in a separate cardboard box.**

The realization of flares for the link on the flare connections should be neat. The presence of burr, crack, a too small or too large flaring surface may cause leakage.



Flared valves must be kept closed during connection.

The tightening torque for the flared valves are:

Diameter ["]	1/4	3/8	1/2	5/8
Couple [N/m]	14 to 18	33 to 42	50 to 62	63 to 77

8 INSTALLATION : HYDRAULIC CONNECTION

The units are delivered with 2 flexible hoses + washers to be easily connected to the water network.

In order to limit clogging of the plate heat exchanger and optimize CU operation, it is advisable to install a strainer filter (Ø 0.1mm) on the CU water inlet piping. This filter must remain easily accessible for the operator so that he can perform a periodical check. A strainer filter performing this function is available as an accessory. It is delivered separately and to be connected at a workmanlike manner.

All precautions should be taken. In particular, it must be ensured that:

- All piping is frost-free
- There is no high point where an air pocket could be formed.
- The pipes have a sufficient section for the water flow that is to be established.
- The available water flow and water pressure are sufficient.

The proper functioning of the CU depends on the good quality of the heat exchange between the refrigerant and the water to reject calories. The water inlet temperature and the flow rate are essential parameters for the proper functioning of the installation:

- If the water temperature is too high or the flow rate is too low, the power output can be lower than the rated power.
- If the water temperature is too high or the flow rate too low, the CU will get into safety (HP cut).

CUs are designed to operate when fed with tap water with a temperature of +15°C and a pressure of 4 bar, with a wide tolerance around these values.

The rated water flows (eg, to provide the rated cooling capacity) of CUs are summarized in the tables below:

Rated water flow for a water inlet temperature of +15°C						
Size FW	07	09	14	18	24	36
Water flow [L/h]	80	100	120	180	270	430

Rated water flow for a water inlet temperature of +30°C						
Size FW	07	09	14	18	24	36
Water flow [L/h]	180	230	240	420	1000	2000

9 INSTALLATION: ELECTRICAL CONNECTION OF THE CU

The installation must be carried out by a person with the appropriate skills and qualifications.

The installation must be switched off before any intervention, by cutting the power supply of the CU.

The choice of the cables must be made by the installer to comply with the standards in force at the time of installation. Among others, the installer will have to pay attention to the electrical powers absorbed in all life phases of the installation. The installer must also mount the necessary protections.

The CU provides power to the IU. The selection of the CU power supply cable must therefore take into account the presence or absence of the "electrical heating" function on the IU. Suggestions regarding the supply cables of the CU are given in the table below, but **the final decision remains the responsibility of the installer**.

CU power cable when IU is **without electrical heating**						
Size FW	07	09	14	18	24	36
Section [mm²]	3 x 1.5	3 x 1.5	3 x 1.5	3 x 2.5	3 x 2.5	3 x 4.0
Max. current [A]	4.1	4.7	6.6	8.8	11.0	14.6

CU power cable when IU is a cassette **with electrical heating**						
Size FW	07	09	14	18	24	36
Section [mm²]	-	-	3 x 1.5	3 x 2.5	3 x 2.5	3 x 4.0
Max. current [A] (cooling mode)	-	-	6.6	8.8	11.0	14.6
Max. current [A] (heating)	-	-	6.4	6.4	9.5	9.5

CU power cable when IU is a ducted indoor unit **with electrical heating**						
Size FW	07	09	14	18	24	36
Section [mm²]	3 x 2.5	3 x 2.5	3 x 2.5	3 x 2.5	3 x 4.0	3 x 6.0
Max. current [A] (cooling mode)	4.1	4.7	6.6	8.8	11.0	14.6
Max. current [A] (heating)	9.2	9.2	10.5	10.5	19.8	29.5

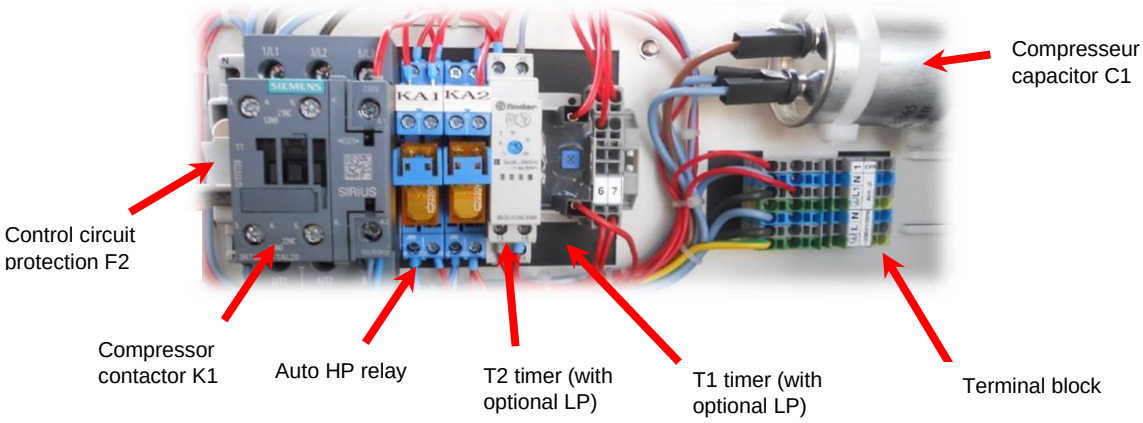
The fuse chosen for the installation at the power supply board must be of the motor support type (i.g. D-curve).

CUs are supplied with a 6A fuse (see F2 in the wiring diagram in paragraph 16). It must therefore be changed if the IU has the "electrical heating" function, the fuse to be installed is **supplied with the IU** (in its electrical box). To check the value of the fuse, refer to the table below.

Control fuse protection – F2						
Size FW	07	09	14	18	24	36
Indoor unit without electrical heating	6 A	6 A	6 A	6 A	6 A	6 A
Cassette indoor unit with electrical heating	-	-	10 A	10 A	10 A	10 A
Ducted indoor unit with electrical heating	10 A	10 A	10 A	10 A	20 A	GI36-40/75Pa : 32 A GI36-40/150Pa : 25 A

The fuse must be of the motor support type (e.g. Am).

Below an example of a CU's electrical panel:



Timers T1 and T2 are present when the condensing unit is delivered with the LP switch option. These times are factory set and this setting must be checked:

→ Timer T1 is the anti-short cycle timer. It must be set open ¼ turned clockwise.

→ The timer T2 is the one that allows the shunt of the LP at startup. It must be set first cursor on 20M and second cursor on 5. (Red light fixed in action then flashing when deactivated).

The CU and the IU must be connected according to the interconnection diagram supplied with the indoor unit.

The installer checks the correct positioning of the switches of his indoor unit. (Refer to the IU documentation).

10 INSTALLATION : FILLING OF REFRIGERATING GAS

The intervention must be carried out by a person with the **appropriate skills and qualifications**. In particular, it must have the **certificate of suitability for the handling of refrigerants**. In addition, the company employing this person must have a **certificate of ability**.

Once the connections have been made, airtightness must be checked keeping the **flared valves closed**:

- Pressurizing dehydrated nitrogen and pressure maintenance control. Check sensitive areas with a leak detector.
- Vacuum drawing: obtain a pressure of 10^{-4} bar and maintain it for 1 hour. Then check the vacuum resistance.

Once the airtightness is checked, the flare valves must be opened. CUs are delivered loaded for a distance of 4 meters of piping. If the lengths are higher, the load must be completed, compressor running, using a load balance, while controlling the overheating and **respecting the operating ranges in chapter 14.**

Size FW	07	09	14	18	24	36
Basic load	450 g	500 g	600 g	800 g	900 g	1 000 g
Additional load	30 g / meter				50 g / meter	

The final load of the installation must be reported by the installer on the condensing unit.

11 USE : UNIT START-UP

This paragraph applies to both the first start-up and the post-intervention startups.



The intervention must be carried out by a person with the **appropriate skills and qualifications**. In particular, it must have the **certificate of suitability for the handling of refrigerants**. In addition, the company employing this person must have a **certificate of ability.**

Before starting up the unit, you must:

- Check the electrical connections are well tightened.
- Check the CU is well evened.
- Check the IU is well evened and that the condensate drain is well connected.
- Check that the power supply voltage at terminals L and N of the CU is correct.
- Check that the flare valves are open.
- Check that the CU is well supplied with water.

The **start of the installation is done via the IU**. When the IU is in cooling demand, it sends the starting instructions to the CU's compressor. The compressor will start and will circulate the fluid.

There is a waiting time of up to 3 minutes for CUs without the LP pressure switch option and up to 9 minutes for CUs with the LP pressure switch option between a cooling demand made via the remote control and the compressor start.

The CU is equipped with the following security features:

- HP pressure switch: it stops the compressor when the pressure is higher than 28 bar. Its reset is automatic (turn off the UI and turn it back on).
- BP pressure switch (option): it stops the compressor when the pressure is less than 0.5 bar. When the pressure rises above 1.5 bar, the pressure switch closes automatically and the compressor starts again after a 5 minute short cycle time delay (T1). It should be noted that the T2 delay allows this safety to be shunted during the first 5 minutes of compressor start-up.



It is important to **carry out complete operational tests during commissioning and to record the measurements on the commissioning sheet** (provided with this documentation). The same tests must also be carried out during the maintenance phases and any troubleshooting interventions.

A complete test must include at least the following measures:

- Temperature measurement of HP, LP, compressor discharge, liquid, compressor suction.
- Temperature measurement of the water in- and outlet.
- Measurement of the current absorbed by the compressor and the IU.



The commissioning form must be completed and returned. The receipt by LTB of this correctly completed form determines the warranty validation.

12 USE : FREQUENT PROBLEMS

Below is a table listing the common defaults:

Default	Probable causes	Action to be taken
The installation does not turn on	No power supply	Check voltage
		Check position of the disconnecting switch
	Bad wiring	Check wiring
The IU is on but does not start	Installation in security mode	Check error codes of the IU
		Check the securities of the CU
	Bad wiring	Check wiring
The IU is in cooling demand but the compressor does not start.	Bad wiring	Check wiring
	Installation in security mode	Check the securities of the CU
	The anti-short-cycle delay has not expired yet	Wait 3 to 8 minutes, see paragraph 10
The installation starts but pressures are abnormal	Unadapted refrigerant load	Remove or add fluid
	Gas leakage	Check airtightness
	Water flow too low	Check water flow (measure, DT water)
	Unadapted water temperature	Check water temperature
	Non-tight compressor valves	Change compressor
	Dirty filter	Check condition of the filter

The warranty does not cover the damage caused in case of incorrect implementation or -use.

13 USE: ADJUSTMENT OF THE PRESSOSTATIC WATER VALVE

The pressostatic water valve is set at the factory. Its setting should normally not be changed. However, it may be necessary to adjust the pressostatic valve, for example:

- When changing the pressostatic valve for a new valve,
- In case the pressostatic valve has been disrupted
- If the CU is installed in a room where the temperature is relatively high.



Pressostatic valves are built to regulate the flow of the water condenser by detecting directly the pressure variations in the HP refrigerating circuit. They open up when the pressure rises (direct action) according to the selected value and close when a pressure lower than 0,5 bar occurs, in a proportional way.

The pressure for which the valve starts to open (opening point) can be adjusted using the screw or square slot situated on top of the spring cage. The adjustment can be done using a screwdriver or a pawl key for adjusting the valves. By turning the screw clockwise, the opening pressure is released and vice versa.

The correct setting of the pressostatic valve is the one that leads to the following condensing temperatures:

	FW 07 Q6	FW 09 Q6	FW 14 Q6	FW 18 Q6	FW 24 Q6	FW 36 Q6
Condensing temperature	+50°C	+50°C	+50°C	+50°C	+45°C	+45°C

These values allow to obtain the rated performance of the CU

In case the CU is located in a room where the temperature is high, it is possible that the ambient temperature around the CU is high enough so that the pressure of the refrigerant, compressor stopped, maintains the valve partially open. Under these conditions, the valve set point should be increased to allow the closing of the valve during periods of compressor shut-down.

A poorly adjusted pressostatic water valve may cause excessive water consumption.

14 USE : OPERATING LIMITS

To preserve the integrity of the CU, make sure that the **water inlet temperature** of the unit is always between the values given in the following table:

Minimum water inlet temperature	+5°C
Maximum water inlet temperature	+43°C

To preserve the integrity of the CU, make sure that the **outdoor ambient temperature** of the unit is always between the values given in the following table:

Minimum ambient temperature	+5°C
Maximum ambient temperature	+45°C

To preserve the integrity of the CU, make sure that the **LP temperature** of the unit is always between the values given in the following table:

Minimum LP temperature	-10°C
Maximum LP temperature	+10°C

To preserve the integrity of the CU, make sure that the **HP temperature** of the unit is always between the values given in the following table:

Minimum HP temperature	+35°C
Maximum HP temperature	+60°C

15 MAINTENANCE

The maintenance must be carried out by a person with the appropriate skills and qualifications.

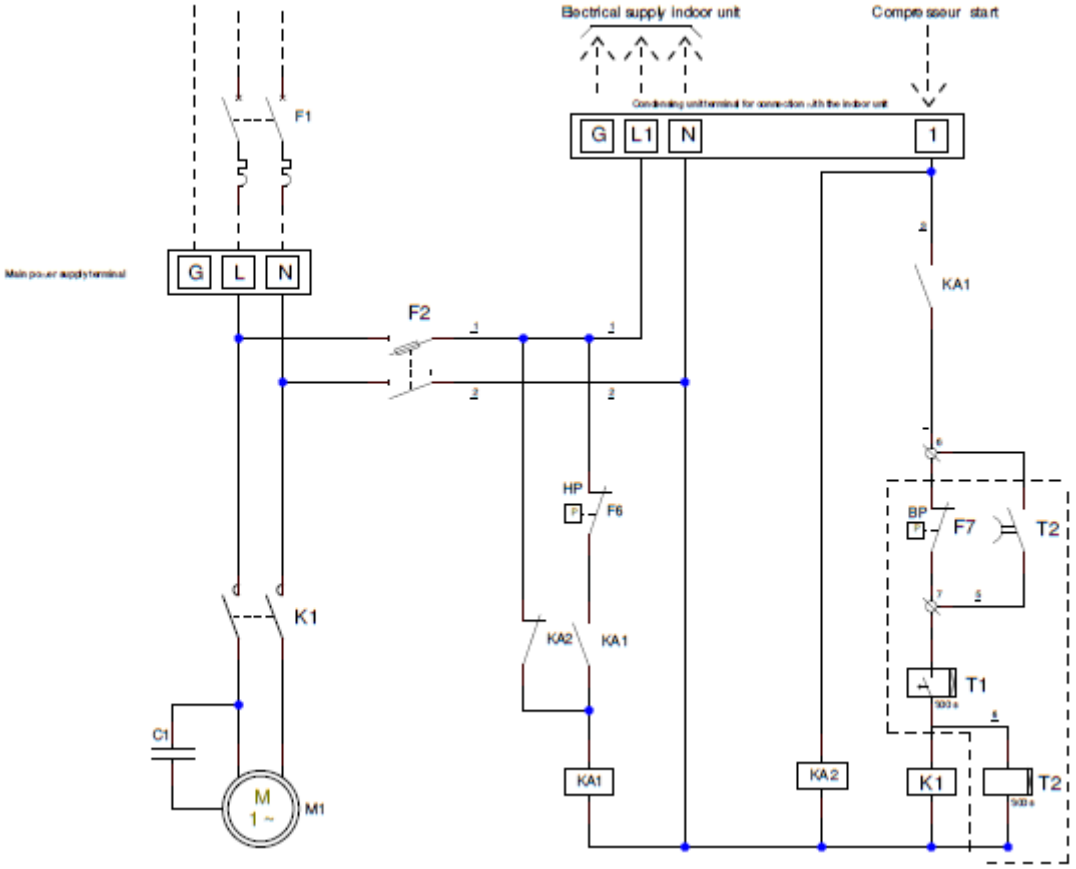
The maintenance frequencies are to be adapted according to the environment and the context of the use of the split sytem, with at least **one maintenance every year**.

During the maintenance, it is necessary to:

- Check the filter condition of the IU and CU, clean and change them if needed.
- Check the functioning of the split-system by taking measurements (see commissioning form).
- Check that the HP pressure switch cuts and resets. It is possible to cause an HP shutdown by closing the CU water supply.
- Check that the LP pressure switch (option) cuts and resets. It is possible to cause a LP shutdown by closing CU liquid flare valve.
- Check for refrigerant leaks.
- Check for no premature wear of the various components.
- Check that the electrical connections are well tightened.
- Check that there is no overheating of electrical cables.
- Check out correct evacuation from the IU to the condensate tray and clean if necessary.
- Check that the pressostatic water valve is not scaled and check that it operates correctly. In particular, it must be checked that it cuts the water flow when the compressor is stopped.

All interventions on the refrigerant circuit must comply with the rules of practice and regulations in force. In particular, it is necessary to recover the refrigerant before opening the circuit and fill the circuit with dehydrated nitrogen before any solder.

16 ELECTRICAL DRAWING



CAPTION:
Wire numbers are underlined
C1 – Capacitor Compressor motor
F1 – Main circuit protection (Installer)
F2 – Control circuit protection
F6 – HP pressure switch (automatic reset)
F7 – LP pressure switch (automatic reset) (Option)
K1 – Compressor contactor
KA1 – HP relay
KA2 – HP reset relay
M1 – Compressor motor
T1 – Anti short cycle relay (Option)
T2 – LP shunt relay at compressor start (Option)

TERMINAL BLOCK CONDENSING UNIT:
G – Earth
L/L1 - Phase
N – Neutral
1 – Compressor
6/7 – LP pressure switch (Option)

NOTA:
The installer must place the electrical protections according to the installation instructions and standards in force.
- - - - - - Wiring to be done by the installer